

BAECKEA RAMOSISSIMA A. Cunn. (MYRTACEAE) A TAXONOMIC AND ECOLOGICAL STUDY

G. W. CARR*

(Accepted 19.6.1978)

ABSTRACT

Carr, G. W. (Botany Department, La Trobe University, Bundoora, Victoria, Australia 3083) 1980. *Baeckea ramosissima* A. Cunn. (Myrtaceae). A taxonomic and ecological study. *Telopea* 1 (6): 409-420.—The taxonomic history of *Baeckea ramosissima* is given. Two subspecies are recognized: *B. ramosissima* subsp. *ramosissima* is widely distributed in coastal and inland localities from northern New South Wales through Victoria to South Australia and Tasmania; *B. ramosissima* subsp. *prostrata* (Hook. f.) G. W. Carr, comb. et stat. nov., occurs in southern coastal New South Wales, southern Victoria and northern and western Tasmania. Both taxa are described and illustrated, also a key to their identification is provided. Distribution of the taxa is mapped. Geographical variation, ecology and biology are discussed.

INTRODUCTION

Baeckea ramosissima (as currently recognized by Australian botanists) is a widespread and very distinct species occurring in south eastern Australia. The eastern Australian species most closely allied to it are *B. crassifolia* Lindl. and *B. ericaea* F. Muell.

My observations on its Victorian populations have supported the view of Willis (1973) that it is "A polymorphic assemblage, some populations of which may merit taxonomic distinction." The descriptions by Black (1952), Curtis (1956) and Beadle *et al.* (1972) further emphasize the variability of this species throughout its range. Populations differ considerably in size of individuals, habit, leaf size, shape and indumentum, floriferousness, flower size and posture, corolla size and colour, floral trichome development and number of stamens. Particularly in Victoria *B. ramosissima* has a very wide ecological amplitude, occurring from sea level to 1930 m and from the extreme east to the far west of the State.

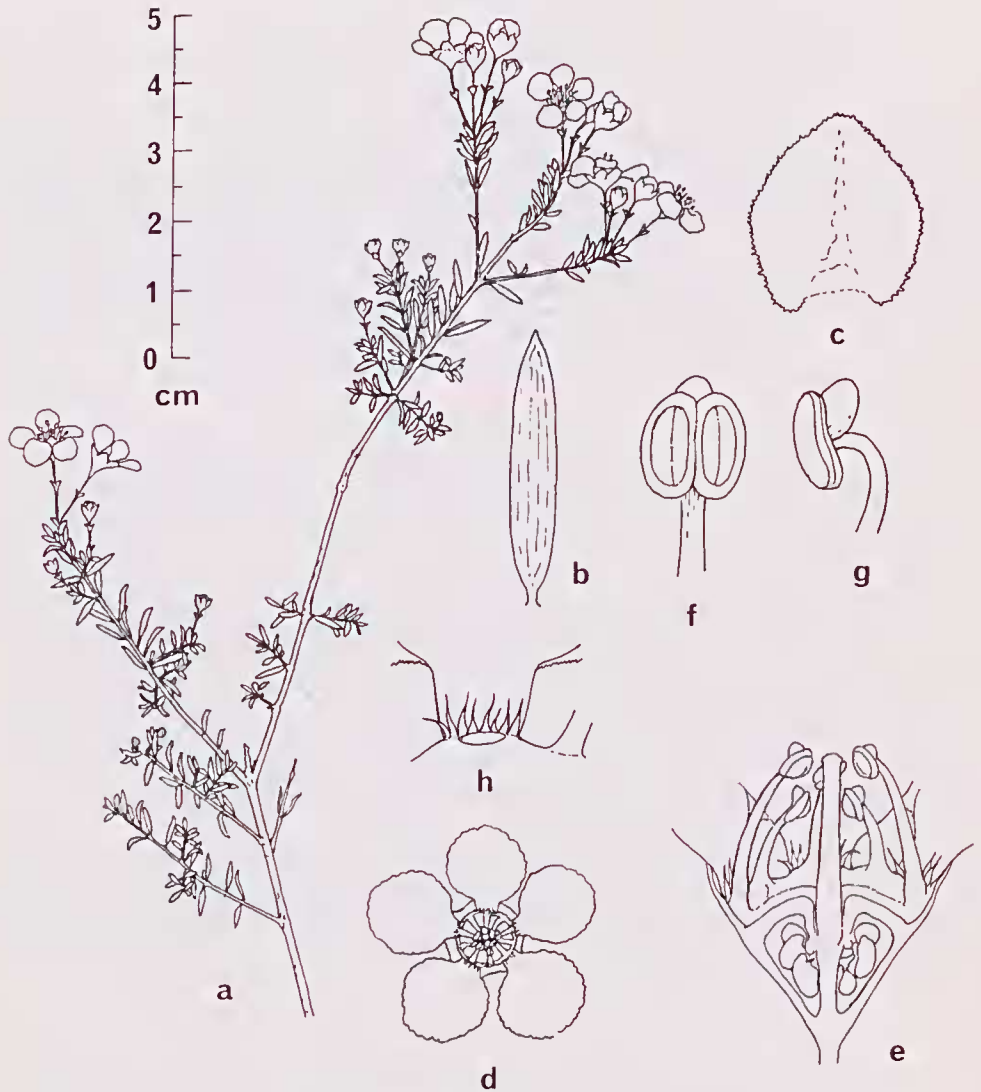
Material of *B. ramosissima* from the following institutions has been examined: AD, CBG, HO, LTB (La Trobe University), MEL, MELU and NSW. Specimens from the private herbarium of A. C. Beaglehole (subsequently referred to as A.C.B.) have also been seen. Populations have been studied extensively in the field in each State but particularly in Victoria.

TAXONOMIC HISTORY

Allan Cunningham (in Field 1825, page 349) published the description of *B. ramosissima* based on material collected in the Blue Mountains of New South Wales in 1822.

The name *B. diffusa* Sieber ex DC. was published in Candolle (1828); its type came from the Port Jackson area (J. H. Willis, pers. comm.). De Candolle simultaneously described *B. diffusa* var. *striata* also from the same area but expressed doubt about its validity. The only differences given were the straited leaves and rigid habit.

* Botany Department, La Trobe University, Bundoora, Victoria, Australia 3083.



G. Carr

Fig. 1. *Baeckea ramosissima* subsp. *ramosissima*.

a. Flowering branch (Carr 7095), natural size. b. leaf, adaxial view, $\times 7$. c. adaxial view of pedicellar bracteole, $\times 26$. d. flower, $\times 2.5$. e. median longitudinal section of flower, $\times 7$. f. ventral view of anther opposite a petal, before dehiscence, $\times 30$. g. lateral view of anther opposite a sepal, before dehiscence, $\times 30$. h. floral trichomes; the petal claw and staminal filament have been removed; lower portion of a staminal filament opposite a sepal is visible to right of the trichomes, $\times 10$.

Lindley (in Mitchell 1838, vol. 2, page 178) described *B. alpina* from material collected on the summit of Mt William in the Grampians during Mitchell's expedition of 1836.

J. D. Hooker (1840, t. 284) described and figured as species, three collections made by Ronald Gunn in Tasmania. These were *B. thymifolia* from the South Esk River, *B. prostrata* from Circular Head and *B. affinis* from Elizabeth River at Campbell Town. Foliar and bracteolar characters were used to separate the taxa; however, Hooker expressed doubt about their status.

When Schauer (1843, page 239) erected the genus *Euryomyrtus* to accommodate species previously placed in *Baeckea*, he synonymized *B. affinis* Hook. f., *B. prostrata* Hook. f., *B. alpina* Lindl. and *B. ramosissima* A. Cunn., all under *Euryomyrtus diffusa* (Sieber ex DC.) Schauer. *Euryomyrtus thymifolia* (Hook. f.) Schauer was retained as distinct.

Subsequently, Hooker (1856, page 142) following Schauer, synonymized *B. prostrata* and *B. affinis* under *B. diffusa* and maintained *B. thymifolia* as a distinct Tasmanian species. About the same time Miquel (1856, page 149) described two new species from Tasmania, *Euryomyrtus parviflora* and *E. stuartiana*.

Under the name *B. diffusa*, Mueller (1864, page 67) combined *E. parviflora* and *E. stuartiana* together with the other described members of the complex, except for *B. ramosissima* which, curiously, he overlooked or ignored. He provided the most complete description yet published for this species and clearly outlined its variability. Bentham (1867, page 76) upheld Mueller's treatment of *B. diffusa* with its synonymy, and placed the species in *Baeckea* section *Euryomyrtus* (Schauer) Benth.; similarly, no mention was made of *B. ramosissima*. Rodway (1903, page 51) also used the name *B. diffusa* and it was not until the publication of Black (1926) that the correct name again appeared in the literature. Since then the whole complex has been universally known as *B. ramosissima*.

VARIATION IN RELATION TO DISTINCTION OF INFRASPECIFIC TAXA

The habit of the plant, the density of the foliage, the flowering times and to a certain extent the floriferousness are affected by the age of the plant and environmental factors; these characters are of little use taxonomically. Floral characters such as posture of the flowers (erect to nodding), size of the flowers, colour of the petals and number of the stamens (3–10) are constant within populations and are diagnostically useful to separate infraspecific entities.

Habit is correlated with wetness of the habitat and the density of the associated plant community. Plants in the wettest and most exposed situations (e.g. alpine) are usually prostrate or procumbent, whilst in the driest sites they are invariably rigidly erect. Young plants are always erect but may become prostrate with age.

Foliage may be loose or dense. Leaves vary in shape from linear to ovate-lanceolate or spatulate, and in size from 2–13 mm long and 0.7–3 mm wide. They differ also in posture and in the distribution of indumentum.

Floriferousness varies, some forms being constantly very floriferous, others sparingly so.

Flowering time is earliest in coastal and latest in alpine situations. The length of the flowering period varies from a few weeks to several months; within the Victorian populations studied it is sufficiently constant to be diagnostically useful.

Floral trichomes are present—usually as a single series of \pm pectinately arranged, multicellular, narrowly conical outgrowths between the petal claw and the base of the staminal filament (see Figs. 1 and 2). Sometimes they are absent, or occur as a double row. Their ontogeny and function is not known but they are quite different in position and structure from other trichomes (usually a single cell thick) occurring widely in Myrtaceae. They have not been found in any other eastern Australian species of *Baeckea* except rarely in *B. crassifolia* Lindl.

Diameter of the corolla at anthesis is an index to the overall size of floral parts and correlates with stamen-number and floral trichome development.

Petal colour varies from white to white tinged with red to brilliant pink or mauve-purple; within populations it is relatively constant.

SYSTEMATIC TREATMENT

Baeckea ramosissima A. Cunn. in Field, Geogr. Mem. New South Wales: 349 (1825); Black, Fl. South Australia, ed. 2, 3: 601, 602 (1952); Curtis, Stud. Fl. Tasmania 1: 195 (1956); Beadle et al., Handb. Vasc. Pl. Sydney Distr.: 295 (1963); Cochrane et al., Fl. and Pl. Victoria: t. 331 col. (1968); Beadle et al., Fl. Sydney Region: 349 (1972); Willis, Handb. Pl. Victoria 2: 457 (1973). HOLOTYPE: Blue Mountains, New South Wales, *Cunningham* 1822 (K, photograph seen).

SYNONYMY: *Baeckea diffusa* Sieber ex DC., Prodr. 3: 320 (1828); J. D. Hooker, Fl. Tasmaniae 1 (2): 142 (1856); F. Mueller, Fragm. 4: 67 (1864); Bentham, Fl. Austral. 3: 76 (1867); F. Mueller, System Victorian Pl. 1: 1150 (1887–1888); Moore & Betche, Handb. Fl. New South Wales: 191 (1893); Rodway, Tasm. Fl.: 51, 52 (1903).—*Enryomyrtus diffusa* (Sieber ex DC.) Schauer in Linnæa 17: 239 (1843); Miquel in Ned. Kruidk. Arch. 4: 149 (1856). HOLOTYPE: Nova Hollandia [Port Jackson area], *Sieber* (G–DC, photograph seen).

B. diffusa var. *striata* DC., *op. cit.* HOLOTYPE: Nova Hollandia [Port Jackson area], *Sieber* (G–DC, photograph seen).

B. alpina Lindl. in Mitchell, Threc Exped. E. Australia 2: 178 (1838).—*Euryomyrtus alpina* (Lindl.) Schauer in Linnæa 17: 239 (1843); Miquel in Ned. Kruidk. Arch. 4: 149 (1856). HOLOTYPE: Mt William, Grampians, *Mitchell*, 1836 (CGE, not seen). ISOTYPE: K. photograph seen.

B. thymifolia Hook. f. in Icon. Pl. 3 (2): t. 284 (1840); J. D. Hooker, Fl. Tasmaniae 1 (2): 141 (1856).—*Euryomyrtus thymifolia* (Hook. f.) Schauer in Linnæa 17: 239 (1843). LECTOTYPE (here designated): South Esk River, Tasmania, *Gunn* 86 (K, photograph seen). LECTOPARATYPES: South Esk River, *Lawrence s. n.*; Port Arthur, *Backhouse s. n.* (K, photograph seen).

B. affinis Hook. f. in Icon. Pl. 3 (2): t. 284 (1840). HOLOTYPE: Elizabeth River, Campbell Town, Tasmania, *Gunn* 683, 1835 (K, photograph seen).

B. prostrata Hook. f. in Icon. Pl. 3 (2): t. 284 (1840). HOLOTYPE: Circular Head, Tasmania, *Gunn* 816 (K, photograph seen).

Euryomyrtus parviflora F. Muell. ex Miq. in Ned. Kruidk. Arch. 4: 149 (1856). HOLOTYPE: Tasmania, *Stuart* (L, not seen). ISOTYPE: Tasmania, Georgetown, *Stuart s. n.* (MEL).

E. stuaetiava F. Muell. ex Miq. in Ned. Kruidk. Arch. 4: 149 (1856). HOLOTYPE: Ad fl. South-Esk River, Tasmania, *F. Mueller*, (L, not seen). ISOTYPE: Tasmania, South Esk River (MEL).

(*E. leptospermoides* F. Muell. ex Miq. in Ned. Kruidk. Arch. 4: 149 (1856), *nomen nudum*).

Shrubs 5–60 cm high and up to 100 cm wide, sparsely to densely branched; branches erect to diffuse and spreading or procumbent to prostrate, often rooting at the nodes, usually rigid, sometimes very slender and lax, glabrous; bark ultimately dark grey or brown, decorticating in long thin strips. *Leaves* opposite, entire, erect

and then \pm decussate, to appressed, crowded or distant, dark green, dotted by oil-glands; petiole slender, 0.2–1.0 mm long, glabrous; lamina flat or slightly concave, linear to linear-lanceolate or ovate-lanceolate to spatulate, 2–13 mm long, 0.7–3.0 mm wide; base \pm rounded, apex acuminate to rounded; surface glabrous to sparsely and very shortly pubescent above and below with hairs usually confined to underside or to ciliate margins, cilia usually confined to upper $\frac{1}{3}$ of leaf margin, often only near apex; texture thin to thick and coriaceous. *Flowers* erect to nodding in 1-flowered, pedunculate, axillary unit inflorescences positioned subterminally on the branches, unit inflorescences rarely paired within an axil (actually borne on a very short lateral shoot); peduncles bearing several minute subulate bracts; peduncles plus pedicels 2–11 mm long; pedicels slender and glabrous with 2 basal, opposite, connate, persistent bracteoles; bracteoles cordate to rhomboid, 0.6–2.0 mm long, apex rounded to acute, margin ciliolate to erose-ciliolate, surface glabrous dotted by oil-glands. *Receptacle* broadly obconical, 2–3 mm maximum diam., dotted by oil-glands, glabrous. *Calyx lobes* 5 borne on a short floral tube, imbricate in bud, persistent, rounded, 1.4–1.7 mm long, dotted by oil-glands; margins ciliolate to erose-ciliolate. *Corolla* 3–15 mm diam. at anthesis; petals 5, sometimes overlapping at anthesis, deciduous, very shortly clawed, orbicular, 1.2–4.5 mm wide, pure white or white tinged with red to brilliant pink or mauve-purple, dotted by oil-glands, margins crenulate-ciliolate or crenulate-erose; a single or double row of up to 15 erect, narrowly conical multicellular floral trichomes 0.2–0.9 mm long located between the petal-claw and the base of the filaments opposite the petals, floral trichomes sometimes absent. *Stamens* 3–10 opposite petals and sepals, when fewer than 10 the stamens opposite the petals predominant; filaments subterete to slightly flattened, those opposite the petals 0.5–1.8 mm long, longer than those opposite the sepals and with their anthers forming a ring above those of the latter; anthers bilocular, versatile, elliptical-globose, turgid, 0.3–0.75 mm long, dehiscent longitudinally, connective produced into a prominent, apical, rounded gland $> \frac{1}{3}$ as long as the anther. *Ovary* broadly obconical, trilocular, its convex summit with 3 sutures and dotted by oil-glands; ovules 4–5 per loculus, placentation axile. *Style* subcylindrical, 0.5–2.6 mm long, inserted in a depression at the summit of the ovary; stigma capitate, minutely papillose. *Capsule* on a deflexed peduncle, depressed globose or globose, 3–4.5 mm diam.; seeds 2–4 per loculus, turgid, reniform, 1.3–1.6 mm long, chestnut brown, the surface with minute convergent papillae each microscopically papillose.

FLOWERING TIME: June to February, rarely as late as March; the flowering period for individual populations may be several weeks to several months.

DISTRIBUTION: Coastal New South Wales from Coffs Harbour to the Victorian border, including the lower Blue Mountains; coastal Victoria from the extreme east to the far south west; montane and alpine locations in north eastern to central and western Victoria both north and south of the Dividing Range; almost throughout Tasmania except for the south-west region; South Australia on the Fleurieu Peninsula from just north of Adelaide to Victor Harbour, and on western Kangaroo Island. See Map 1.

KEY TO THE SUBSPECIES

1. Flowers erect, corolla (5–) 7–10 (–15) mm diam., petals white to brilliant pink or mauve-purple. Floral trichomes 2–15, always present. Stamens 10 or rarely fewer
 subsp. *ramosissima* a.
- 1.* Flowers nodding, corolla 3–5 mm diam., petals white, \pm tinged with red above or below. Floral trichomes few or absent. Stamens (3–) 5–10 subsp. *prostrata* b.

a. *B. ramosissima* subsp. *ramosissima* (Synonymy as for the species but excluding *B. prostrata* and *Euryomyrtus parviflora* F. Muell. ex Miq.).

Rigid erect to prostrate or procumbent shrubs 5–60 cm high, sparsely branched to densely matted. *Leaves* linear-lanceolate to ovate-lanceolate or spatulate 2–13 mm long, 1.0–3.0 mm wide, acute to obtuse, texture coriaceous. *Inflorescences* solitary or rarely paired, erect at anthesis, later deflexed. *Petals* 2.0–4.5 mm wide. *Ovules* usually 5 per loculus. *Capsule* 4–4.5 mm diam., seeds 3–4 per loculus. Fig. 1. Flowering Time: August to January depending upon climate; latest in alpine situations. The flowering period for Victorian populations is relatively brief, usually 3–4 weeks.

DISTRIBUTION: New South Wales from Coffs Harbour to near Sydney; in Victoria in inland localities except for coastal occurrences at Frankston and near Mt Richmond (far south west); Tasmania, in the eastern half of the State and from coastal to inland localities; South Australia in the Southern Lofty Region and on Kangaroo Island. See Map 1.



Map 1. Distribution map—*Baeckea ramosissima* subsp. *ramosissima* (●), *B. ramosissima* subsp. *prostrata* (▲) and intermediates (□); compiled from herbarium specimens.

SELECTED SPECIMENS: NEW SOUTH WALES: North Coast: Coffs Harbour, *Boorman NSW 133871*, 9.1909 (NSW); behind Lighthouse Beach, Port Macquarie-Cathie Ck road, *Pullen 2626* (NSW); 1 mile [1.5 km] N. of Lake Cathie near Port Macquarie, *Verdon 155*, 8.1969 (CBG); Old Bar, *Burgess CBG 007266*, 9.1963 (CBG); Nubioc aerodrome, *Burgess NSW 133877*, 3.1962 (NSW); Seaham, *Lucas NSW 133875*, 8.1894 (NSW); Port Stephens, *Boorman NSW 133874*, 9.1911 (NSW); Tomago Sandbeds, *McDonald NSW 133878*, 9.1956 (NSW); Newcastle, *Brown NSW 133881*, 1802-5 (NSW). Central Coast: Maroota, *Blakely & Shireess NSW 133820*, 9.1929 (NSW); Canoe Grounds, *Blakely & Shireess NSW 133815*, 10.1927; Glenorie, *Williams CBG 007106*, 10.1961 (CBG); off Chapman Parade, 7 km from Faulconbridge, *Pulley 851, 864*, 9.1971 (CBG); Linden, *Hamilton NSW 133811*, 9.1914 (NSW); Glenbrook, *Hamilton NSW 133806*, 10.1914 (NSW); Pennant Hills rifle range, *Johnson 16*, 4.1945 (NSW); Sutherland, *Camfield NSW 133805*, 9.1893 (NSW); Heatheote road between Lucas Heights and Liverpool, 2 km SE. of Deadmans Creek, *Carr 6207, 6208, 6214*, 9.1975 (AD, CANB, LTB, NSW); Royal National Park, c. 2 km W. of Bundeena, *Carr 7042, 7048*, 9.1975 (AD, CANB, LTB, NSW); Waterfall, Royal National Park, *Fraser NSW 133831*, 8.1934 (NSW).

VICTORIA: between Gorae and Mt Richmond, *Beaglehole 38991*, 1946 (ACB); Growlers Hill, Tarnagulla, *Phillips CBG 007320*, 9.1961 (CBG); near Wedderburn, *Robbins ACB 38703*, c. 1945 (ACB); on scarp near Redmans Bluff, Grampians, *Whaite NSW 133856*, 11.1953 (NSW); Mt William, *Mueller (MEL)*; Major Mitchell Plateau, Grampians, *Beaglehole 16477*, 12.1967 (ACB); Three Jacks Wildflower Reserve near Stawell, *Carr 7094-7108*, 8.1973 (AD, CANB, LTB, NSW); Eaglehawk, *Blissill (MEL)*; Whipstick Scrub N. of Bendigo on Kamarooka Road, *Phillips CBG 019036*, 10.1966 (CBG); 15 miles [24 km] NNE. of Bendigo, *Aston 417*, 10.1959 (MEL); Rushworth, *Corrick MELU 16327, 16328, 16329*, 9.1973, (MELU); Blackwood Ranges c. 5 km W. of Blackwood, *Carr 7080-7085*, 10.1973 (AD, CANB, LTB, NSW); northern Brisbane Ranges c. 8 km S. of Greystones, *Carr 7076-7079*, 9.1973 (AD, CANB, LTB, NSW); Rowsley, Brisbane Ranges, *Dave* 10.1966 (MEL); Wandong Ranges, *Walter NSW 133859*, 10.1898 (NSW); road to Kinglake 5.4 km from St Andrews township, *Carr 6306-6310*, 10.1975 (AD, CANB, LTB, NSW); Dandenong Ranges, Nangana, N. of Cockatoo, *Willis 11.1934* (MEL); Tynong North, *Lewis* 10.1947 (MEL); Frankston, *Burnside MELU 16147*, 9.1961 (MELU); Inglewood, *Nolan (MEL)*; Mandurang, *Begg 8.1949* (MEL); near Monolith, *Robbins ACB 38744*, c. 1940 (ACB); W. foot of McLeod, Buffalo N. Plateau, *Willis 2.1963* (MEL); summit of Sugarloaf *Sisentan 5034*, 7.1963 (MEL); Mt Buller, *Mueller 3.1853* (MEL); summit of Mt Ligar, *Mueller (MEL)*; Mt Hump, *Whaite NSW 133851*, 1.1949 (NSW); Moroka Range, 0.6 km SE. of Moroka Hut, c. 8 km E. of Mt Wellington, *Beaglehole 43472*, 11.1973 (ACB, CANB, NSW); Howitt Airstrip, Snowy Plains, *Simmons 50*, 12.1973 (AD, CANB, LTB, NSW); c. 6.5 km E. of Licola, *Beaglehole, Willis & Chesterfield ACB 43387*, 10.1973 (ACB, AD, CANB, NSW); Labretouche, E. of Bunyip River, *Willis* 10.1941 (MEL).

TASMANIA: Bridport, *Curtis 303*, 11.1952 (HO); on road to Herriek near St Helens, *Phillips CBG 007096*, 11.1960 (CBG); South Esk River, Launceston, *Gunn 86*, 9.1842 (NSW); Bicheno, *Storey (MEL)*; Campbell Town, *Gunn NSW 133842* (NSW); Clarence Plains, *Gunn 683*, 10.1840 (NSW); mouth of Swan and Apsley Rivers at Schouten, *Storey (MEL)*; Grass Tree Hill, *Lang HO 719*, 10.1931 (HO); Coppington, *Giblin HO 6808*, *NSW 133844*, 10.1929 (HO, NSW); Single Hill, Cambridge, *Lang HO 513*, 8.1931 (HO); Kangaroo Point, Bellerive, *Rodway NSW 133847*, 10.1898 (NSW); Hobart, *Lucas NSW 133849*, 12.1923 (NSW); Huon River, *Gunn 683*, 10.1839 (NSW); Tasman Arch, *Phillips CBG 007094*, 11.1960 (CBG); Huon, *Gunn NSW 133841*, 10.1839 (NSW); Bruny Island, *Shoabridge CBG 041261*, 9.1962 (CBG).

SOUTH AUSTRALIA: Mt Lofty, *Ising AD 96942409* (AD); between Aldgate and Heathfield, *Griffith AD 96828130*, 12.1906 (AD); Halls Creek, Encounter Bay, c. 5 km W. of Victor Harbour, *Cleland AD 96009040*, 1.1945 (AD); Aldgate, c. 14 km SE. of Adelaide, *Ashby AD 966041241*, 11.1894 (AD); Kycema National Park, c. 45 km SSE. of Adelaide, *Smith 365*, 9.1967 (AD); SE. corner of Cox's Scrub National Park, *Carr 7071, 7072*, 8.1973 (LTB); Mt Compass c. 48 km S. of Adelaide, *Cleland AD 96009051*, 1.1922 (AD); near Mt Jagged telephone exchange on the Adelaide to Victor Harbour road, *Carr 7062-7064*, 8.1973 (AD, CANB, LTB, NSW); c. 7.5 km S. of Mt Compass, eastern side of road to Victor Harbour, *Eichler 13889*, 6.1957 (AD); near Tooperang, c. 55 km S. of Adelaide, *Cleland AD 96411104*, 8.1963 (AD); Hindmarsh Tiers, c. 10 km N. of Victor Harbour, *Cleland AD 96009037*, 11.1950 (AD); upper Hindmarsh Valley, c. 10 km N. of Victor Harbour, *Cleland AD 96009038* (AD); near Port Elliot, *Hussey AD 95811111*, 1.1895 (AD); 10 miles [16 km] from Victor Harbour towards Cape Jervis, *Carroll CBG*, 10.1965 (CBG); Deep Creek, Flcurieu Peninsula, *Fagg 798*, 8.1970 (CBG); Middle River, N.W. Kangaroo Island, *Ashby 754*, 10.1905 (NSW); Rocky River c. 25 km SSE. of Cape Borda, *Cleland AD 96009048*, 11.1924 (AD); c. 3.75 km W. of Kelly Hills, south-western part of Kangaroo Island, *Eichler 15177*, 11.1958 (AD); Kangaroo Island, c. 3.5 km W. of Parndana on Playford Highway, *Anderson 3321A, 3321B, 3321C*, 10.1976 (LTB); c. 12.75 km N. of Playford Highway on ridge W. of Western River, north western Kangaroo Island, *Eichler 15349*, 11.1958 (AD); Long Hill, Kangaroo Island, *Jackson 81*, 11.1960 (AD); Harveys Return, Kangaroo Island, *Rogers NSW 133864*, 9.1908 (NSW); West Stokes Bay, Kangaroo Island, *Rogers NSW 133863*, 9.1908 (NSW); De Mole River, Kangaroo Island, *Tate AD 96828135*, 11.1888 (AD).

b. *Baeckea ramosissima* subsp. *prostrata* (Hook. f.) G. W. Carr, comb. et stat. nov.

BASEYNYM: *B. prostrata* Hook. f. in Leon. Pl. 3 (2): t. 284 (1840).

Euomyrtus parviflora F. Muell. ex Miq.

Procumbent or prostrate shrubs 8–20 cm high, erect when young, branches slender, rigid or lax, usually sparsely branched. *Leaves* linear to linear-lanceolate, 3–10 mm long, 0.7–1.5 mm wide, acute or acuminate, texture chartaceous. *Inflorescences* sparser than in subsp. *ramosissima*, solitary, deflexed at anthesis. *Petals* 1.0–2.5 mm wide. *Ovules* usually 4 per loculus. *Capsule* 3–4 mm diameter, seeds 2–3 per loculus. Fig. 2. *Flowering Time*: June to February, extending over a period of several months. Ripe fruits often developing within the flowering period.

DISTRIBUTION: Southern coastal New South Wales; coastal Victoria, discontinuously from near Mallacoota to Moonlight Head in western Victoria, with an isolated non-coastal occurrence in the Grampians; Tasmania on the northern and western coasts. See Map 1.

SELECTED SPECIMENS: NEW SOUTH WALES: **South Coast**: Roscby Park, Shoalhaven, *Rodway NSW 133834*, 3.1917 (NSW); Ben Boyd National Park, 26 km from turnoff on Princes Highway, *Anderson 3542*, 9.1976 (LTB); Nadgee Nature Reserve, 2.2 km N. of Little River estuary, *Cameron 4785*, 11.1975 (LTB, NSW).

VICTORIA: 1 km W. of Strachans Huts, Victoria Valley Road, Grampians, *Carr 7089–7093*, 9.1973 (AD, CANB, LTB, NSW); Port Campbell National Park, *Beaglehole & Finck 21256*, *21306*, 9.1966 (ACB); Moonlight Head, western Otway Ranges, *Carr 7058*, *7059*, 10.1973 (LTB); West Otway Ranges, low heath above sea cliffs at Castle Cove, Glen Aire, *Willis 9.1960* (MEL); Otway Ranges near waterfall on Distillery Creek, c. 3 miles [4.8 km] NW. of Aireys Inlet, *Willis & Carr 10.1969* (MEL); c. 5 km N. of Anglesea, *Carr 7048*, *7049*, 5.1969 (LTB); Mt Oberon, Wilsons Promontary, *Groves 147*, 9.1963 (MELU); Sperm Whale Head, *Hart* (MEL); c. 8 miles [13 km] SE. of Orbost on Marlo Plains, *Henshall 9.1967* (MEL); Cape Conran, *Beaglehole 34002*, 9.1970 (ACB); mouth of Seal Creek, SW. of Mallacoota, *Cameron 199 A, B, C, D, E*, 8.1975 (AD, CANB, CBG, NSW); East Gippsland, mouth of Betka River c. 3 km SW. of Mallacoota, *Willis 10.1948* (MEL).

TASMANIA: Rocky Cape, *Gunn NSW 133835*, 10.1838 (NSW); hills behind Sisters Beach near Rocky Cape, *Carr 6581*, 2.1976 (LTB); Deep Creek Plain, Smithton, *Curtis 303A*, 5.1948 (HO); Georgetown, *NSW 133838*, 10.1844 (NSW); Little Badger Head, Asbestos Range, 57 km NW. of Launceston, *Carr 6646*, *6647*, *6648*, *6649*, 2.1976 (AD, CANB, HO, NSW).

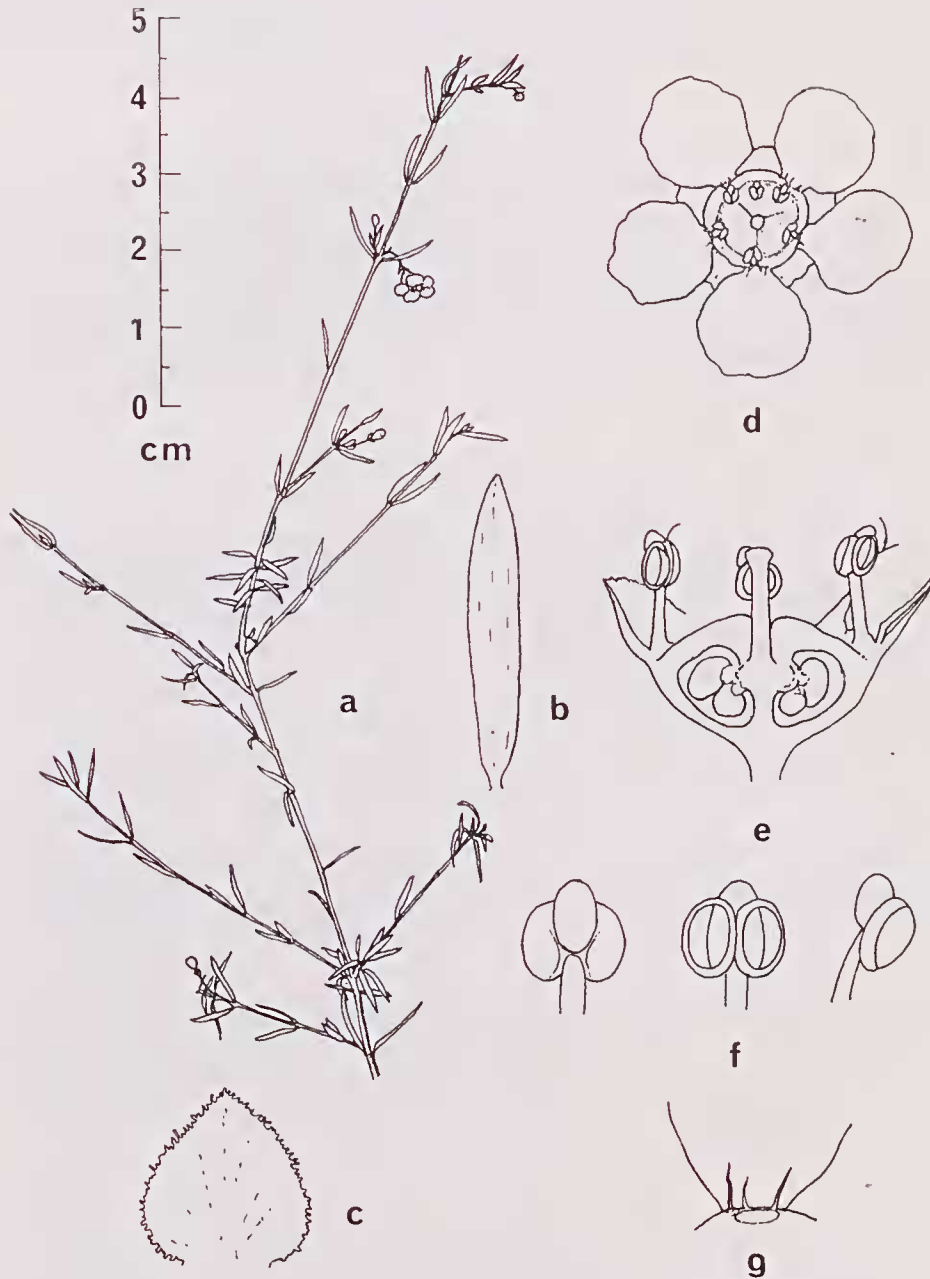
Some specimens collected from near Sydney south to Jervis Bay are morphologically intermediate between the subspecies. A collection from South Australia is also unassignable to either taxon.

INTERMEDIATE SPECIMENS: NEW SOUTH WALES: **Central Coast**: road SSW. of Peats Ferry, *Deane NSW 133825*, 9.1883 (NSW); Abbotsford, *Rupp 8.1915* (NSW); Lane Cove, *Rupp 9.1918* (MEL); Balgowlah North, off Warringah Street, *Pulley 300*, 8.1969 (CBG); Parramatta, *Mueller* (MEL); Centennial Park, Sydney, *Cheal NSW 133821*, 9.1899 (NSW); sandhills near Kensington, *Betche NSW 133814*, 8.1894 (NSW); Karloo Pool to Uloola Falls, National Park, *Johnsou 9.1950* (NSW); The Basin, Georges River E. of Minto, *McBarron 19141*, 1.1970 (NSW); The Pheasants Nest, Nepean River, 10 miles [16 km] S. of Camden, *Constable 6183*, 10.1965 (NSW). **South Coast**: Nowra Creek, Nowra, *Rodway NSW 133883*, 5.1924 (NSW); Beecroft Peninsula 1.5 miles [2.5 km] from Currarong, *Phillips CBG 023043*, 8.1967 (CBG); Jervis Bay, roadside to R.A. Naval College, *Rodway NSW 33882*, 4.1948 (NSW); Jervis Bay, Caves Beach road, *Macmillan 72/141*, 12.1972 (CBG); roadside c. 1 km E. of entrance to Jervis Bay Naval College, *Carr 6242 A, B, C*, 9.1975 (LTB, NSW); Jervis Bay, *Gauba CBG 007093*, 7.1950, *007109*, 9.1951, *007092*, 9.1952 (CBG).

SOUTH AUSTRALIA: road connecting Mt Compass and Myponga roads, c. 15 km from Victor Harbour, *Hunt 3039*, 9.1969 (AD).

VARIATION, DISTRIBUTION AND ECOLOGY

Within *B. ramosissima* the most constant entity is subsp. *prostrata*; subsp. *ramosissima* is polymorphic but divisible into three forms for which formal recognition is not considered appropriate.



G. Carr

Fig. 2. *Baeckea ramosissima* subsp. *prostrata*.

a. Flowering branch of young plant (Carr 7054), natural size. b. leaf, $\times 5.5$. c. pedicellar bracteole flattened, adaxial view, $\times 25$. d. flower, $\times 18.5$. e. median longitudinal section of flower, $\times 16$. f. undehiscent anther in dorsal, ventral and lateral views, $\times 14.5$. g. floral trichomes at base of petal, stamen removed, $\times 7.5$.

B. ramosissima subsp. *prostrata*

This subspecies is confined to heaths or heathy woodlands within c. 8 km of the coast, except for an isolated occurrence in the Grampians where both subspecies occur but have not been found growing together and intermediates have not been seen. In the Grampians it usually occurs at lower altitudes than does subsp. *ramosissima*.

Intermediate populations and specimens

Populations which cannot be assigned to either subspecies have been observed on sandy soils in the vicinity of Sydney south to Jervis Bay in New South Wales and at one locality near Victor Harbour in South Australia. From my observations the intermediate populations in the Jervis Bay area are morphologically constant. However, further field observations and collections are needed to determine whether this is the case in the Sydney region and elsewhere. Occasionally, because of colour changes, and disorientation of parts in pressing, it is difficult to assign dried collections to a particular subspecies.

B. ramosissima subsp. *ramosissima*

The geographical and ecological ranges of this subspecies are much wider than those of subsp. *prostrata*. It occurs from 30° 18' to 43° 23' S. of latitude, from sea-level to 1930 m, in forest, woodland or heath, in acidic often infertile soils derived from sandstone, shale, granite or dolerite, and in localities between which the range in mean annual rainfall is 500–1900 mm.

Broadly there are 3 forms of subsp. *ramosissima* but the patterns of variation and distribution are complex.

The type form of the subspecies occurs in New South Wales and South Australia. The types of *B. diffusa* and *B. diffusa* var. *striata* belong to this form. It has a very diffuse habit, small leaves, the smallest flowers of the subspecies, and, occasionally, fewer stamens. In New South Wales it is restricted to the Sydney region where it is widespread on sandstone areas. Within this form the flowers from plants in the Blue Mountains are larger than those nearer the coast. Except for the intermediates already mentioned, this is the only form of the species to occur in South Australia.

In striking contrast to this is the large-flowered form which occurs on the north coast of New South Wales, in Victoria and in Tasmania where only this form of the subspecies occurs. The types of *B. affinis*, *B. thymifolia*, *B. alpina* and *Euryomyrtus stuartiana* belong here. It has a diffuse, often procumbent habit (especially at high altitudes), is very floriferous and has large, often brilliantly coloured flowers; its leaves are in the upper size range for the species. In eastern Victoria it ranges from forest or woodlands of the foothills to above the treeline in the Alps; further west it occurs at Blackwood and in the higher parts of the Grampians. At the lower elevations it is found in areas of sandstones and shales, in the Alps it is on granite. At least some of the populations in New South Wales occur on coastal sand-dunes; in Tasmania it grows on soils derived from granite or dolerite. The range of mean annual rainfall between the places where it occurs is c. 550–1900 mm. The Kinglake (Vic.) population of this form is a morphological extreme having a high percentage of axils with paired inflorescences (not seen in other collections) and very large leaves and flowers.

The third form of subsp. *ramosissima* occurs as scattered populations in central and western Victoria, usually on shales and sandstones, and within the lower mean annual rainfall range for the species, 510–585 mm. It has a rigid upright habit, small leaves and is very floriferous, with flowers in the upper size range. The petals are often brilliantly coloured. The specimen portrayed in Fig. 1 is of this form.

It is known from the Brisbane Ranges, and from the vicinity of Stawell, Bendigo and Rushworth, with outlying occurrences near the coast at Mt Richmond in the far south west and at Frankston.

REPRODUCTIVE BIOLOGY

There are significant differences between the two subspecies in their breeding biology: subsp. *ramosissima* has a flowering peak of about 3–4 weeks during September to October, or November at lower elevations, whereas subsp. *prostrata* flowers for several months between June and February (or sometimes as late as March). In cultivation it has flowered continually for 4 months during winter and spring. There is a strong correlation between floriferousness, size of flowers and duration of the flowering; subsp. *prostrata* is the least floriferous, smallest flowered and longest flowering. Within subsp. *ramosissima* the type form is the least floriferous and probably flowers for longer than the other two forms. In addition subsp. *ramosissima* usually has 3–4 seeds per loculus, whereas subsp. *prostrata* usually has 2–3.

Flowers of both subspecies are protandrous; after the anthers dehisce the style elongates bringing the capitate stigma to the level of the anthers opposite the petals where it matures. Nectar is produced by immersed glands distributed over the summit of the ovary. Cultivated plants which have been isolated from insects have produced fruits, suggesting that flowers are self-compatible and able to be self-pollinated. In late anthesis the filaments curve inwards and sometimes bring the anthers in contact with the stigma.

At Blackwood (Vic.) in November 1976 I observed pollination of subsp. *ramosissima* by dipterous and hymenopterous insects presumably attracted by the showy corolla. The hover fly *Syrphus viridiceps* Maquart appeared to be the main pollinator; other frequent visitors were the honey bee *Apis mellifera* L., the blowfly *Calliphora stygia* (Fabr.) and the housefly *Musca domestica* L. A small ant (*Iridomyrmex* sp.) was also a visitor to the flowers, taking nectar but not effecting pollination.

Pollinators of subsp. *prostrata* have not been observed, but because of the small deflexed flowers and the flowering period they are unlikely to be the same species as visit subsp. *ramosissima*. Hover flies are not on the wing for much of the winter-early spring flowering period. Ants may play a role or well-developed self-pollination may be operative.

Seeds are not actively dispersed but drop freely from the inverted capsules.

Plants of subsp. *prostrata* are more precocious than those of subsp. *ramosissima* and flower when only a few centimetres high and less than a year old.

B. ramosissima is highly sensitive to fire; stands are even-aged, dating from the last fire.

ACKNOWLEDGEMENTS

I gratefully acknowledge the assistance of Dr R. F. Parsons, Dr B. G. Briggs, Mr D. J. McGillivray, Dr J. H. Willis and Dr J. B. Kirkpatrick, as well as the Directors of the State Herbaria in Victoria, New South Wales, South Australia and Tasmania, and the officer-in-charge of The Herbarium, National Botanic Gardens, Canberra, also A. C. Beaglehole, J. Minchinton, R. Adair, A. Yen, A. Calder, D. Palmer, R. Anderson, D. Cameron, S. Harris and the New South Wales National Parks and Wildlife Service. I am especially grateful to Miss Helen Aston, a former Australian Botanical Liaison Officer, for locating and providing photographs of type material.

LITERATURE CITED

- Beadle, N. C. W., Evans, O. D. and Carolin, R. C., 1972—Flora of the Sydney Region. A. H. & A. W. Reed, Sydney.
- Bentham, G., 1867 ('1866')—Flora Australiensis 3. Lovell Reeve & Co., London.
- Black, J. M., 1926—Flora of South Australia, part 3. Government Printer, Adelaide.
- Black, J. M., 1952—Flora of South Australia, ed. 2, part 3. Government Printer, Adelaide.
- Candolle, A. P. De, 1828—Prodomus systematis naturalis regni vegetabilis, 3. Treuttel et Würtz, Paris.
- Curtis, W. M., 1956—The Student's Flora of Tasmania, part 1. L. G. Shea, Government Printer, Tasmania.
- Field, B., [ed.] 1825—Geographical memoirs on New South Wales. Murray, London.
- Hooker, J. D., 1840—Icones Plantarum, t. 284.
- Hooker, J. D., 1855–1860—Flora Tasmaniae. Lovell Reeve & Co., London.
- Mitchell, T. L., 1838—Three expeditions into the interior of eastern Australia. 2 vols. London.
- Miquel, F. A. W., 1856—Stirpes Novo-Hollandas a Ferd. Mullero collectas. Ned. Kruidk. Arch. 4: 97–150.
- Mueller, F., 1864—Fragmenta phytographiae Australiae, 4, fasc. XXVI. Melbourne.
- Rodway, L., 1903—The Tasmanian flora. John Vail, Government Printer, Hobart.
- Schauer, J. C., 1843—Genera Myrtacearum nova vel denuo recognita. Linnæa 17: 235–244.
- Willis, J. H., 1973 ('1972')—A handbook to plants in Victoria 2. Carlton, Melbourne University Press, Victoria.